Visualising A Career Full of Data
Torch 2016

Richard J Self
Research Fellow, Big Data Laboratory
University of Derby

http://tinyurl.com/ppyg6t8
http://computing.derby.ac.uk
email: r.j.self@derby.ac.uk
Getting Started

- Loughborough University (K13!)
  - Documenting Statistics package
  - Writing hyperbolic functions for IBM 1620
  - Life Assurance Policy Optimisation
- BSA Research Centre
- RR undergraduate Apprentice
  - 3D Visualisation software
  - Weekly Spares Invoicing system
IBM 1620 computer

10K decimal digits Ferrite Core memory plane

Hyperbolic Trig Functions Tanh, Cosh, etc. for student use

IBM 1311 - 2MB Drive
What elements and proportions in metal sample from tail pipe

Complex iterative solution

Before
Half day collecting data, four and half days calculating answers

After
Half day calculating answers
RR Undergraduate Apprentice
Cambridge University – Jesus College
- Part 1 Tripos – Natural Science
- Part 2 Tripos – Computing
Rolls-Royce plc

- Raw Materials Forecasting
- Project Business Evaluations
- Warranty Forecasting
- Project Management System
- Aerospace Overhaul Business Opportunities
- SAP server performance
## Raw Materials Forecasting

### Hockey Stick Forecasts

<table>
<thead>
<tr>
<th>Year</th>
<th>1969a</th>
<th>1969b</th>
<th>1970a</th>
<th>1970b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>100</td>
<td>95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>90</td>
<td>95</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>1971</td>
<td>100</td>
<td>100</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>1972</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>100</td>
</tr>
<tr>
<td>1973</td>
<td>120</td>
<td>120</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>1974</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>1975</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>1976</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>760</td>
<td>760</td>
<td>770</td>
<td>760</td>
</tr>
</tbody>
</table>

The chart illustrates the trend of raw materials forecasting from 1969 to 1976.
Warranty Forecasting

500 installed and spare engines in fleet

Life of one disk a problem and changing rapidly
What is the replacement programme?
How much will it cost?
SAP System Capacity Analysis

ERP Production CPU Utilisation in Starfires
Averaged over periods 10:00 to 13:00 and 14:00 to 15:00
SAP Transaction ST06 (User + System total)
SAP System Capacity Analysis

![Production ERP SAS Daily User Totals](chart.png)

- **Total individual ERP users during the day**
- **Concurrent Users**

<table>
<thead>
<tr>
<th>Date</th>
<th>Individual Users per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-Mar</td>
<td>2696</td>
</tr>
<tr>
<td>25-Mar</td>
<td>2660</td>
</tr>
<tr>
<td>01-Apr</td>
<td>2643</td>
</tr>
<tr>
<td>08-Apr</td>
<td>2616</td>
</tr>
<tr>
<td>15-Apr</td>
<td>2658</td>
</tr>
<tr>
<td>22-Apr</td>
<td>3086</td>
</tr>
<tr>
<td>29-Apr</td>
<td>2992</td>
</tr>
<tr>
<td>06-May</td>
<td>3001</td>
</tr>
<tr>
<td>13-May</td>
<td>2999</td>
</tr>
<tr>
<td>20-May</td>
<td>2106</td>
</tr>
<tr>
<td>27-May</td>
<td>2070</td>
</tr>
<tr>
<td>03-Jun</td>
<td>1457</td>
</tr>
<tr>
<td>18-Mar</td>
<td>1579</td>
</tr>
<tr>
<td>25-Mar</td>
<td>2003</td>
</tr>
<tr>
<td>01-Apr</td>
<td>2076</td>
</tr>
<tr>
<td>08-Apr</td>
<td>2025</td>
</tr>
<tr>
<td>15-Apr</td>
<td>2005</td>
</tr>
<tr>
<td>22-Apr</td>
<td>2413</td>
</tr>
<tr>
<td>29-Apr</td>
<td>1749</td>
</tr>
<tr>
<td>06-May</td>
<td>1799</td>
</tr>
<tr>
<td>13-May</td>
<td>2498</td>
</tr>
<tr>
<td>20-May</td>
<td></td>
</tr>
<tr>
<td>27-May</td>
<td></td>
</tr>
<tr>
<td>03-Jun</td>
<td></td>
</tr>
</tbody>
</table>
University of Derby

- Learning Analytics
- Location Services Accuracy and Insights
Location Services

Accuracy and Stability
Triggers to Research Project

22km error

Wandering while stationary

Night-time wandering

Start-up movement

4900m error from top of Mont-Royal
V Horecny – Key Insight – Chipsets

HTC-M8 (blue) modern chipset
HTC-Desire S (Pink) early version chipset
Farondeep Bains – Key Insight – Cars and Cararks

Bar Chart Demonstrating The Error Difference In The Same Carpark Whilst Busy and Empty

- Car Park When Busy high picture: 411.82
- Car Park When Busy medium: 935.49
- Car park When busy low picture: 100.88
- Empty Car Park Low: 10.133
- Empty Car Park high: 10.133
- Empty Car Park medium: 10.133

Richard J Self - University of Derby
Amna Al-Mutawa – Key Insight – Time Variability

Date: 10.03.15
01:31 pm to 01:43 pm

Richard J Self - University of Derby
Mont-Royal, Montreal, QC
Single Point Error

First Reading
Horizontal Journey whilst Standing Still

Mont Real
Altitude Errors

Altitude Journey

True Alt = 231m
Beijing Journey

Note mis-alignment of Images and map Roads and Rail on Google Maps. Error is 100m North 550m East Compared to photo images (correct!)

Journey Velocity Vectors
Journey Acceleration Vectors

Interval Lat Accel m/s/s

North

-3 -2 -1 0 1 2 3

-5 -4 -3 -2 -1 0 1 2 3
Understanding the World

- What are the numbers?
- What are the models?
- What can they tell us?
- Insights?
- Changing the world!